

What is claimed is:

- 1 1. A vacuum exhaust apparatus for exhausting gas from at least two
2 process vacuum chambers, comprising:
3 a sub-atmospheric chamber having at least two inlets and an outlet;
4 a plurality of high-vacuum pumps, each said high-vacuum pump connected on
5 an exhaust side to one of the inlets of the sub-atmospheric chamber, each said high-
6 vacuum pump being connected on a vacuum side to one of the process vacuum
7 chambers for controlling vacuum within that chamber; and
8 a backing pump connected to the outlet of the sub-atmospheric chamber, for
9 maintaining vacuum within that chamber.
- 1 2. The vacuum exhaust apparatus of claim 1, further comprising a
2 sub-atmospheric abatement device in the sub-atmospheric chamber for conditioning
3 exhaust.
- 1 3. The vacuum exhaust apparatus of claim 2, wherein the sub-
2 atmospheric abatement device is a scrubber.
- 1 4. The vacuum exhaust apparatus of claim 2, wherein the sub-
2 atmospheric abatement device is a plasma device.
- 1 5. The vacuum exhaust apparatus of claim 1, wherein the sub-
2 atmospheric chamber is proximate the process chambers.
- 1 6. The vacuum exhaust apparatus of claim 1, wherein the sub-
2 atmospheric chamber is remote from the process chambers.

1 7. The vacuum exhaust apparatus of claim 1, wherein an internal
2 volume of the sub-atmospheric chamber reduces an effect of pressure changes in one
3 of the process chambers on pressure in another of the process chambers.

1 8. The vacuum exhaust apparatus of claim 1, wherein the high-
2 vacuum pumps are turbo pumps.

1 9. The vacuum exhaust apparatus of claim 1, wherein the high-
2 vacuum pumps are turbo pumps capable of exhausting to a pressure of over 1 torr.

1 10. The vacuum exhaust apparatus of claim 1, wherein the high-
2 vacuum pumps are turbo pumps capable of exhausting to a pressure of over 5 torr.

1 11. The vacuum exhaust apparatus of claim 1, further comprising
2 throttle valves connected to exhaust sides of the high-vacuum pumps.

1 12. The vacuum exhaust apparatus of claim 11, wherein the high-
2 vacuum pumps are turbo pumps.

1 13. The vacuum exhaust apparatus of claim 1, wherein the backing
2 pump is proximate the sub-atmospheric chamber.

1 14. The vacuum exhaust apparatus of claim 1, further comprising an
2 atmospheric abatement device connected to an exhaust side of the backing pump.

1 15. The vacuum exhaust apparatus of claim 14, wherein the
2 atmospheric abatement device is a device selected from the group consisting of a wet
3 scrubber, a dry scrubber and a combination dry/wet scrubber.

1 16. The vacuum exhaust apparatus of claim 1, comprising four process
2 vacuum chambers and four high-vacuum pumps.

1 17. A semiconductor manufacturing system, comprising:
2 a plurality of semiconductor vacuum processing chambers;
3 a plurality of pressure control units, each said pressure control unit connected
4 to one processing chamber for evacuating said chamber;
5 a single sub-atmospheric abatement chamber connected to exhaust sides of
6 each of said pressure control units, whereby all of said pressure control units exhaust
7 into the single sub-atmospheric abatement chamber;
8 abatement means in the sub-atmospheric abatement chamber for conditioning
9 exhaust in the sub-atmospheric abatement chamber;
10 a single backing pump connected to the sub-atmospheric abatement chamber
11 for maintaining sub-atmospheric pressure in the sub-atmospheric abatement chamber;
12 and
13 an atmospheric abatement chamber connected to an exhaust of the backing
14 pump.

1 18. The semiconductor manufacturing system of claim 17, wherein
2 said pressure control unit comprises a turbo pump connected for evacuating the one
3 processing chamber, and a throttle valve connected to an exhaust side of the turbo
4 pump.

1 19. The semiconductor manufacturing system of claim 17, wherein the
2 abatement means in the sub-atmospheric abatement chamber is a plasma device.

1 20. The semiconductor manufacturing system of claim 17, wherein
2 each of the plurality of pressure control units is connected directly to the sub-
3 atmospheric abatement chamber.

1 21. The semiconductor manufacturing system of claim 17, wherein
2 each of the plurality of pressure control units is connected remotely to the sub-
3 atmospheric abatement chamber.

1 22. The semiconductor manufacturing system of claim 17, wherein
2 each of the vacuum processing chambers is located within a clean room, and the sub-
3 atmospheric abatement chamber is located outside the clean room.

1 23. The vacuum exhaust apparatus of claim 17, wherein an internal
2 volume of the sub-atmospheric chamber reduces an effect of pressure changes in one
3 of the processing chambers on pressure in another of the processing chambers.

1 24. A method for exhausting gas from a plurality of process vacuum
2 chambers to achieve a process vacuum pressure, the method comprising the steps of:
3 evacuating to an intermediate vacuum pressure greater than the process
4 vacuum pressure, the process vacuum chambers and a sub-atmospheric abatement
5 chamber, using a backing pump connected to an outlet of the abatement chamber;
6 independently evacuating to the process vacuum pressure each of the process
7 vacuum chambers using a plurality of high-vacuum pumps, each of said high-vacuum
8 pumps being connected for evacuating one of the process vacuum chambers; each of
9 said high-vacuum pumps further being connected for exhausting into inlets of said
10 sub-atmospheric abatement chamber; and

11 conditioning exhaust in the sub-atmospheric abatement chamber using an
12 abatement device.

1 25. The method of claim 24, further comprising the step of
2 independently controlling a pressure in each said process vacuum chamber using a
3 corresponding high-vacuum pump and a corresponding throttle valve at an exhaust
4 side of each high-vacuum pump.

1 26. The method of claim 24, wherein the intermediate vacuum pressure
2 is between 5 and 10 torr.